

PCB CONTAMINATION AT URBAUER HALL

**WASHINGTON UNIVERSITY
HILLTOP CAMPUS
ONE BROOKING DRIVE
St. Louis, Missouri 63130**

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
MDNR (DNR)	Missouri Department of Natural Resources
mg/kg	milligrams per kilogram
PCB(s)	Polychlorinated biphenyl(s)
ppm	parts per million
ug/100cm ²	micrograms per 100 square centimeters

1.0 SUMMARY

In 2002, the elevators at Washington University were load-tested, and the cylinders on two elevators failed. When the two elevator cylinders were replaced, the spilled hydraulic fluid, and sand and soil contaminated with hydraulic fluid were remediated as an oil spill. When the hydraulic fluid and contaminated sand and soil were tested for disposal, it was discovered that PCBs were present in the waste from Urbauer Hall. Subsequent testing of the Urbauer Hall's elevator hydraulic system and all hydraulic elevators and lifts installed prior to 1983 at Washington University showed that all are PCB free. (Level of detection 1.5 ppm.) It is believed that the contamination came from the hydraulic fluid used in the Urbauer Hall elevator when it was installed in 1959. Sometime after installation, the PCB contaminated oil was removed and the system flushed to remove any remaining PCBs. See Section 3 - DISCUSSION, for further information.

All twelve wipe tests of the area around Urbauer Hall elevator were below EPA cleanup requirements in 40 CFR 761.125(c)(4)(ii). The only contamination of concern found was the concrete in the elevator pit in front of the cylinder steel supports. The average PCB concentration, 94 ppm, of the top part of the concrete in front of the cylinder is above the 10 ppm cleanup goal for soil in nonrestricted access area. The concrete behind the supports was below 4 ppm. The danger of being in an elevator pit severely restricts access to the pit, but the pit doesn't meet the requirement of a restricted access location found in 40 CFR 761.123. Since the pit does not meet the definition of a restricted access location and to reduce potential exposure to PCBs, the contaminated concrete in front of the supports should be encapsulated with epoxy. The encapsulation should consist of two coats of 20 wet mils of TECHNI-PLUS AEP 20 with 30 x 50 mesh flintshot applied between coats, or equivalent material for encapsulation.

To ensure proper maintenance of the encapsulation and disposal of the contaminated concrete, information on the PCB contaminated concrete must be maintained in Washington University files. A memo to file, this report and all other reports concerning the PCB contaminated concrete should be placed in Urbauer Hall's building files at the Facilities Planning & Management Department. The report and memo to file should also be kept on file in the EH&S office. See APPENDIX A -MEMO TO FILE AND SIGNAGE for a draft of the memo to file. This information must be maintained until demolition or remodeling removes the concrete in the elevator pit. A sign should also be posted in the elevator pit. See APPENDIX A -MEMO TO FILE AND SIGNAGE for the signage. These actions follow 40 CFR 761 Subpart G - PCB Spill Cleanup Policy.

2.0 HISTORY

In the summer of 2002, the elevators at Washington University were load-tested. The cylinders on two elevators (one at Simon Hall and another at Urbauer Hall) failed and were replaced. See Drawing 1 on next page for a drawing of Urbauer Hall's elevator cylinder and pit. The replacement consisted of:

1. raising the elevator to its highest point and locking it in place,
2. removing the piston from the cylinder, and the hydraulic fluid from inside the cylinder,
3. removing concrete, hydraulic fluid, and contaminated sand and soil from around the outside of the cylinder, and the cylinder,
4. placing a new cylinder inside the casing and filling the void between the casing and cylinder with sand,
5. replacing the concrete floor and cylinder steel supports,
6. replacing the piston, connecting the piping, and replacing the lost hydraulic fluids,
7. testing the system and placing the elevator back into service.

Since the hydraulic fluid is an oil product, the hydraulic fluid and contaminated concrete, sand and soil were remediated and the cleanup waste collected for disposal. Simon Hall was remediated on Friday, July 26, 2002 and Monday, July 29, 2002. Fourteen drums of waste were generated for disposal. Urbauer Hall cleanup was performed on Tuesday, July 30, 2002 and Wednesday, July 31, 2002, producing seven drums of waste. The remediation was done as an oil spill and all visible oil contamination sand and soil was removed.

During the disposal of the hydraulic fluid and contaminated sand and soil, seven of the 21 drums were found contaminated with PCBs between 0.5 to 11%. The magnitude of the amount of PCBs found was calculated to be a maximum of 210 pounds or 18 gallons. For the calculations and analytical results, see APPENDIX B - ESTIMATE of PCBs in DRUMS REMOVED from URBAUER HALL, ANALYSES of PCB CONTAMINATED DRUMS and CERTIFICATE of DESTRUCTION.

When Washington University was notified by the disposal company that PCBs were present in the Urbauer Hall waste drums, the incident was reported to the MDNR Spill Response Center on 12/23/02 and assigned a case number of 021223-1326-ADC. Since the release might have exceeded the reportable quantity for PCBs (1 pound in any 24 hour period), on January 02, the incident was also reported to National Response Center and assigned a case number of 633199-WARD. Calls were also made to EPA Region 7 Toxics/PCB division and an update made to MDNR Emergency Response Section. Burns & McDonnell was contracted to help determine what needed to be done, insure all EPA and DNR requirements were fulfilled, and supervise any remediation, and Wellington Environmental was contracted to do the additional test and any additional remediation.

For reasons covered in Section 3 - DISCUSSION, it was concluded that the PCB contamination came from Urbauer Hall. Its elevator hydraulic system and surrounding area were sampled on January 6, 2003. Two liquid samples of the hydraulic system fluids, one liquid sample from the elevator pit sump, three boring samples of the concrete in the elevator pit, and ten wipe samples of the concrete and tile floors in the area around the elevator outside the pit were taken. No PCBs were found in the hydraulic system. All ten wipe tests were under the cleanup standard in 40 CFR 761.125(b)(4)(ii) of 10 ug/100cm² for nonrestricted access areas. The only concerns were the PCBs found in elevator pit's concrete floor and sump. The PCB concentration in the sump liquid was 2,986 ppm. The concentration in the concrete varied from 3 to 147 ppm, which calculates to a magnitude of 0.3 pound of PCBs. For the analytical results, calculations, and Sampling Plan see APPENDIX C - ANALYTICAL RESULTS of URBAUER HALL SAMPLING, CALCULATION of AMOUNT OF PCBs in URBAUER HALL'S CONCRETE, and SAMPLING PLAN for URBAUER HALL.

After receiving the results from Urbauer Hall, the elevator at Simon Hall was sampled on January 15, 2003. No PCBs were found in the elevator fluid or wipe samples. All three concrete samples had PCBs results below 0.05 ppm. For the analytical results and Sampling Plan, see APPENDIX D - ANALYTICAL RESULTS of SIMON HALL SAMPLING and SAMPLING PLAN for SIMON HALL.

The liquid in Urbauer Hall's elevator pit sump was removed on March 4, 2003 and two wipe samples of the steel supporting the cylinder were taken. ALL the wipe samples were under the cleanup standard in 40 CFR 761.125(c)(4)(ii) of 10 ug/100cm² for nonrestricted access areas. For the analytical results and Sampling Plan, see APPENDIX E - ANALYTICAL RESULTS of URBAUER HALL STEEL SUPPORTS SAMPLING and SAMPLING PLAN for URBAUER HALL ELEVATOR'S STEEL SUPPORTS.

3.0DISCUSSION

When Long Elevator (the company who maintains the elevators at Washington University) load tested the elevators, the cylinders failed at Urbauer Hall (Urbauer) and Simon Hall (Simon), which released hydraulic fluid (fluid) from the cylinder. Long Elevator hired Heritage Environmental Services Inc. (Heritage) to remove the fluid and contaminated sand and soil (fluid and soil) from the elevator pits. Heritage remediated Simon first by using a "Vac Truck" to remove the fluid and soil and loaded it into 14 drums. Heritage then remediated Urbauer and loaded the fluid and soil into seven drums. When the drums were tested for disposal, seven drums were found to contain PCBs. Prior to this analysis, Long Elevator and Washington University did not know that the fluid contained PCBs.

For the reasons listed below it was determined that the PCBs came from Urbauer:

- Seven of the 21 drums came from Urbauer, which equals the seven of 21 drums that were contaminated with PCBs. Simon produced the other 14 drums, which did not have any detectable level of PCBs.
- The drums were numbered sequentially as they were filed. The last 7 drums were contaminated and the last 7 drums came from Urbauer
- Urbauer's elevator was installed in 1959 and Simon's elevator in 1985.

Not all the fluid in Urbauer's elevator tank was changed when its cylinder was changed. About half of the fluid remained in the system. When no PCBs (level of detection at 1.53 mg/kg (ppm)) were found in the elevator system (system) at Urbauer, the laboratory analysis was doubled checked and nothing was found to cause doubt about the "Not Detected" results. This supports the conclusion that the original source of PCB's was from initial installation, since removing half of the fluid would not remove all the PCBs.

To insure that Simon's elevator was not a source of PCB contamination it was checked and no PCBs, at 1.47 mg/kg (ppm) level of detection, were found. In addition, all of the hydraulic elevators and lifts throughout the University installed prior to 1983 were sampled for PCB contamination, and all the results were "Not Detected" for PCBs.

It is believed that PCBs were in the Urbauer system when it was installed and some oil containing PCBs was probably spilled during installation or possibly released during the elevator's earlier use. Sometime after installation, the PCB contaminated fluid was removed and the system flushed to remove any

remaining PCBs. The contaminated concrete and liquid found in the Urbauer elevator pit is believed to be the result of the remediation done by Heritage in 2002, the earlier PCBs removal and flushing, or releases before the PCBs were removed from the system. Heritage could have contaminated the concrete or the fluid in the sump by spilling some of the contaminated fluid on the pit's concrete floor while removing contaminated fluid from the casing. The earlier PCB removal could have contaminated the concrete or fluid in the sump by spilling some contaminated fluid on the pit's concrete while the fluid was being removed from the elevator cylinder.

Two liquid samples of the hydraulic system fluids, one liquid sample from the elevator pit sump, three boring samples of the concrete in the elevator pit, ten wipe samples of the concrete and tile floors in the area around the elevator outside the pit, and two wipe samples of the steel supports in the pit were taken. All the results of the 12 wipe tests of the Urbauer system are below the cleanup standard in 40 CFR 761.125(c)(4)(ii) of $10 \text{ ug}/100\text{cm}^2$ for nonrestricted access areas. The only contamination found that remains above the cleanup levels referenced in 40 CFR 761.125(c)(4), is the concrete in front of the cylinder supports (looking from the elevator door). The PCB concentration found in the concrete behind the cylinder steel supports was below 4 mg/kg (ppm), which is below the 10 ppm clean up level for soil in nonrestricted areas. If the concrete is flushed or washed with a solvent, the PCBs might move from the concrete to the soil below the concrete. Therefore, this was ruled out as a corrective action. Since the concrete carries the cylinder and its load, removal the concrete would require the removal of the cylinder, which is a time consuming and costly task. Therefore, this was ruled out as a corrective action.

The PCBs found in the concrete in front of the cylinder steel supports varied from 46 to 147 ppm. Since this is above the 10 ppm, clean up level for soil in nonrestricted areas found in 40 CFR 761.125(c)(4)(v), action must be taken to address this issue. Although the elevator pit does not meet the definition of a restricted access area found in 40 CFR 761.123, the pit is closer to a restricted access area than a nonrestricted area. The only personnel entering the pit have been Long Elevator to work on the cylinder, and Heritage Environmental or Wellington Environmental to perform testing or cleanup services. Elevator pits are dangerous places and should not be entered without careful considerations of the dangers and proper lockout procedures. The area can not be entered without overriding the safety lockout on the door.

After considering the Three potential remedial actions:

- Washing the PCB from the concrete

- Removing the concrete
- Encapsulating the concrete

Burns & McDonnell recommends that the concrete area in front of the cylinder support be coated with an epoxy lining, like KCC Corrosion Control's TECHNI-PLUS AEP 20. See drawing on page 2 for the area to be encapsulated. Filler should be used to give a rough surface to reduce the possibility of injuries from slipping on the coating. The coating should consist of two coats of 20 wet mils of TECHNI-PLUS AEP 20 with 30 x 50 mesh flintshot applied between coats, or an equivalent. See APPENDIX F for Technical Information on TECHNI-PLUS AEP 20.

4.0 CONCLUSIONS

- The PCBs contaminated fluid, sand, and soil was from the Urbauer Hall elevator and was disposed of properly.
- Urbauer Hall elevator's hydraulic system is now free of PCBs, "Not Detected" at 1.53 mg/kg (ppm) reporting level.
- The elevator pit sump and contaminated concrete floor in front of the steel supporting the Urbauer Hall elevator's cylinder are above the clean requirement in 40 CFR 761.125(c)(4) and require remedial action such as encapsulation.
- To ensure the concrete encapsulation is properly maintained and any concrete removed is disposed of properly, two signs should be placed in Urbauer Hall's elevator pit. A copy of the sign is in APPENDIX A-MEMO TO FILE AND SIGNAGE.
- To ensure the concrete encapsulation is properly maintained and any concrete removed is disposed of properly, a one page memo to file and this report should be given to the Director of Facilities, Planning and Management to be placed in Urbauer Hall building file. This report and the memo to file should also be kept on file in the EH&S office. For a draft of the memo to file, see APPENDIX A-MEMO TO FILE AND SIGNAGE.

5.0 FUTURE WORK

1. The concrete in front of the Urbauer Hall elevator's cylinder steel supports (including the sump) needs to be encapsulated with an epoxy coating consisting of two coats of 20 wet mils of TECHNI-PLUS AEP 20 with 30 x 50 mesh flintshot applied between coats, or an equivalent encapsulation material. See drawing on page 3 for the area to be encapsulated.
2. Post a sign in the Urbauer Hall elevator pit to ensure the concrete encapsulation is properly maintained and any concrete removed is properly disposed of. For the information on the sign, see APPENDIX A-MEMO TO FILE AND SIGNAGE.
3. A one page notice to file and this report needs to be submitted to the Washington University's Director of Facilities Planning and Management to be placed in Urbauer Hall's building file. This is to ensure the maintenance of the encapsulation, the proper handling and disposal of any contaminated concrete or soil, and the proper sampling of the pit and soil area when demolition or remodeling of Urbauer Hall occurs.

APPENDIX A

MEMO TO FILE and SIGNAGE

WASHINGTON UNIVERSITY MEMO LETTER HEAD

Date: To be complete when floor is coated.

To: File

From: Linda Vishino

Re: URBAUER HALL ELEVATOR

The elevator in Urbauer Hall has been remediated for PCB contaminated hydraulic oil but test results of the concrete floor in the front half of the pit show it is contaminated with less than 150 ppm PCBs. Therefore, the front half of the floor has been encapsulated with two coats of TECHNI-PLUS AEP 20 epoxy sealer. The coating must be maintained until the concrete floor is removed, which is not expected until the elevator or building is demolished.

The concrete floor and the soil below the concrete must be assumed to be contaminated by PCBs unless future tests show otherwise. Therefore, any work requiring the removal of any part of the encapsulation, concrete floor, or soil below it, must be handled as PCB waste. The workers must be qualified and properly protected and all contaminated materials must be properly disposed.

Linda Vishino
Environmental Compliance Officer
Environmental Health & Safety Department